

WHAT IS CLAIMED IS:

- 1 1. A method of inducing cardioplegic arrest in a heart of a patient, the heart having a
- 2 coronary vasculature, comprising the steps of:
  - 3 a) introducing at least one distal end of at least one perfusion catheter into a peripheral
  - 4 artery of said patient;
  - 5 b) advancing said distal end of said perfusion catheter from said peripheral artery into
  - 6 at least one coronary ostium communicating with said coronary vasculature of said patient;
  - 7 c) occluding said coronary ostium with an occlusion device proximate said distal end
  - 8 of said perfusion catheter;
  - 9 d) arresting the heart.
- 1 2. The method of claim 1, wherein step d) comprises the substep of infusing a cardioplegic
- 2 agent through a lumen of said perfusion catheter into said coronary vasculature downstream
- 3 of said occlusion device.
- 1 3. The method of claim 2 wherein said cardioplegic agent is infused through said lumen of
- 2 said perfusion catheter at a rate of at least approximately 100 ml/min at a pump pressure not
- 3 exceeding 350 mmHg.
- 1 4. The method of claim 1, wherein step d) comprises the substep of infusing a mixture of
- 2 oxygenated blood and a cardioplegic agent through a lumen of said perfusion catheter into
- 3 said coronary vasculature downstream of said occlusion device at a rate of at least
- 4 approximately 100 ml/min at a pump pressure not exceeding 350 mmHg.
- 1 5. The method of claim 1, further comprising the step of:
  - 2 e) isolating said coronary vasculature from systemic circulation of said patient by
  - 3 continuing to occlude said coronary ostium with said occlusion device while the heart is
  - 4 arrested.

1 6. The method of claim 5, further comprising the step of:  
2 f) maintaining systemic circulation of said patient with peripheral cardiopulmonary  
3 bypass.

1 7. The method of claim 6, wherein step f) comprises:  
2 positioning an arterial cannula in a peripheral artery of said patient;  
3 positioning a venous cannula in a peripheral vein of said patient;  
4 withdrawing venous blood from said patient through a blood flow lumen in said  
5 venous cannula;  
6 infusing oxygenated blood into said patient through an infusion lumen in said arterial  
7 cannula.

1 8. The method of claim 1, further comprising the steps of:  
2 g) introducing a third distal end of a catheter through an aortic valve of said heart of  
3 said patient;  
4 h) venting a left ventricle of said heart by withdrawing fluid through a venting lumen  
5 communicating with said third distal end of said catheter.

1 9. The method of claim 1, wherein step a) comprises introducing a single perfusion catheter  
2 having at least two distal ends into said peripheral artery of said patient; step b) comprises  
3 advancing said at least two distal ends into at least two coronary ostia; step c) comprises  
4 occluding each of said at least two coronary ostia with an occlusion device proximate each of  
5 said at least two distal ends, respectively; and step d) comprises infusing a cardioplegic agent  
6 through at least one lumen communicating with said at least two distal ends of said perfusion  
7 catheter into said coronary vasculature downstream of said occlusion devices.

1 10. The method of claim 9, further comprising the steps of:

2                   g) introducing a third distal end of said perfusion catheter through an aortic valve of  
3    said heart of said patient;  
4                   h) venting a left ventricle of said heart by withdrawing fluid through a venting lumen  
5    communicating with said third distal end of said catheter.

1    11. The method of claim 1, wherein step a) comprises introducing the distal ends of at least  
2    two perfusion catheters into said peripheral artery of said patient; step b) comprises  
3    advancing said distal ends of said at least two perfusion catheters into at least two coronary  
4    ostia; step c) comprises occluding each of said at least two coronary ostia with an occlusion  
5    device proximate each of said distal ends of said at least two perfusion catheters,  
6    respectively; and step d) comprises infusing a cardioplegic agent through at least two lumina  
7    communicating with said distal ends of said at least two perfusion catheters, respectively, into  
8    said coronary vasculature downstream of said at least two occlusion devices.

1    12. The method of claim 11, further comprising the steps of:  
2                   g) introducing a distal end of a venting catheter through an aortic valve of said heart  
3    of said patient;  
4                   h) venting a left ventricle of said heart by withdrawing fluid through a venting lumen  
5    communicating with said distal end of said venting catheter.

1    13. The method of claim 1, wherein step c) comprises inflating an inflatable occlusion  
2    device to occlude said coronary ostium.

1    14. The method of claim 1, wherein step a) comprises the substeps of:  
2                   introducing a guide catheter having at least one internal lumen into said peripheral  
3    artery of said patient; and  
4                   introducing said at least one distal end of said at least one perfusion catheter through  
5    said at least one internal lumen of said guide catheter.

1 15. The method of claim 11, wherein step a) comprises the substeps of:  
2 introducing a guide catheter having at least one internal lumen into said peripheral  
3 artery of said patient; and  
4 introducing the distal ends of said at least two perfusion catheters through said at least  
5 one internal lumen of said guide catheter.

1 16. The method of claim 11, wherein step a) comprises the substeps of:  
2 introducing a guide catheter having at least two internal lumina into said peripheral  
3 artery of said patient; and  
4 introducing the distal end of a first perfusion catheter through a first internal lumen in  
5 said guide catheter, and introducing the distal end of a second perfusion catheter through a  
6 second internal lumen in said guide catheter.

1 17. The method of claim 1, further comprising the step of:  
2 i) performing coronary artery bypass graft surgery on the arrested heart of the patient.

1 18. A catheter system for inducing cardioplegic arrest in a heart of a patient, said catheter  
2 system comprising:  
3 an elongated catheter shaft, said catheter shaft having at least two distal branches,  
4 including:  
5 a first distal branch having a first distal end and a first occlusion device proximate  
6 said first distal end, said first distal branch having a first perfusion lumen which  
7 communicates with a first distal perfusion port distal to said first occlusion device, and  
8 a second distal branch having a second distal end and a second occlusion device  
9 proximate said second distal end, said second distal branch having a second perfusion lumen  
10 which communicates with a second distal perfusion port distal to said second occlusion  
11 device.

1 19. A catheter system for inducing cardioplegic arrest in a heart of a patient, said catheter  
2 system comprising:  
3       a first perfusion catheter having a first elongated catheter shaft, said first catheter shaft  
4 having a first distal end and a first occlusion device proximate said first distal end, said first  
5 catheter shaft having a first perfusion lumen which communicates with a first distal perfusion  
6 port distal to said first occlusion device, and  
7       a second perfusion catheter having a second elongated catheter shaft, said second  
8 catheter shaft having a second distal end and a second occlusion device proximate said  
9 second distal end, said second catheter shaft having a second perfusion lumen which  
10 communicates with a second distal perfusion port distal to said second occlusion device.